

FILE COPY

FINAL RPR FILE

CONFIDENTIAL

ED-134C

file - Ballon

Pillow Lerie

Ballast Release

Q

IGI Ballaster

00 May 1961

25X1

CONFIDENTIAL

~~CONFIDENTIAL~~

TABLE OF CONTENTS

- I. Description
- II. Operating Principle
- III. Ballaster Construction
- IV. Ballast Liquids
- V. Duration Capabilities
- VI. Filling Procedure
- VII. Pictures
- VIII. Flight Test Data

25X1

I. Description

The IGI Ballaster is a simple atmospheric powered ballasting device which is used to make small, inherently unstable balloons float for extended periods of time. It is useful over altitude ranges from approximately 3000 ft. to 45,000 ft. and with a total load including balloon of up to about 20 pounds.

The ballaster is designed to operate when the balloon descends a predetermined distance below its peak altitude and will discontinue ballast flow after floating altitude is regained. In this way it is a demand ballaster and will be very economical in ballast consumption.

II. Operating Principle

After inverting the ballaster from the filling position (see A-1) the ballast is retained in the ballast tank by a liquid valve (see A-2) which prevents air intake into the tank. This liquid valve is in the top of a hollow cylinder which floats in a liquid reservoir. This cylinder, or float, will move up or down within limits in response to changes in atmospheric pressure. Its normal position is up, and in this position the liquid valve is closed. An increase in absolute ambient pressure of 6-8% is sufficient to cause the float to move downward exposing the tank orifice, opening the liquid valve and allowing ballast to flow.

When equilibrium is restored, the balloon will ascend and the float will rise, terminating ballast flow. It will be noted that as the ballast tank empties the entrapped air above the ballast will expand, driving out ballast which is not needed. This does not become serious unless the balloon undergoes large altitude excursions as a result of heavy turbulence or sunset effects.

III. Ballaster Construction

The ballaster is an injection molded polystyrene product resistant to alcohol. Although it is strong in construction, care should be exercised in handling to prevent dropping it on a hard surface.

IV. Ballast

As a result of testing and use it has been found that isopropyl alcohol is the most desirable ballast. A technical or good commercial grade of alcohol, not exceeding 5-10% water is recommended although other alcohols and certain hydrocarbons might be used.

Ballaster sensitivity is a function of specific gravity of ballast. The higher the density of solution the poorer the sensitivity. Water can be used as a ballast with a sacrifice of altitude control, but it should be used only when the balloon is to be flown at altitudes where there is no danger of freezing.

V. Duration

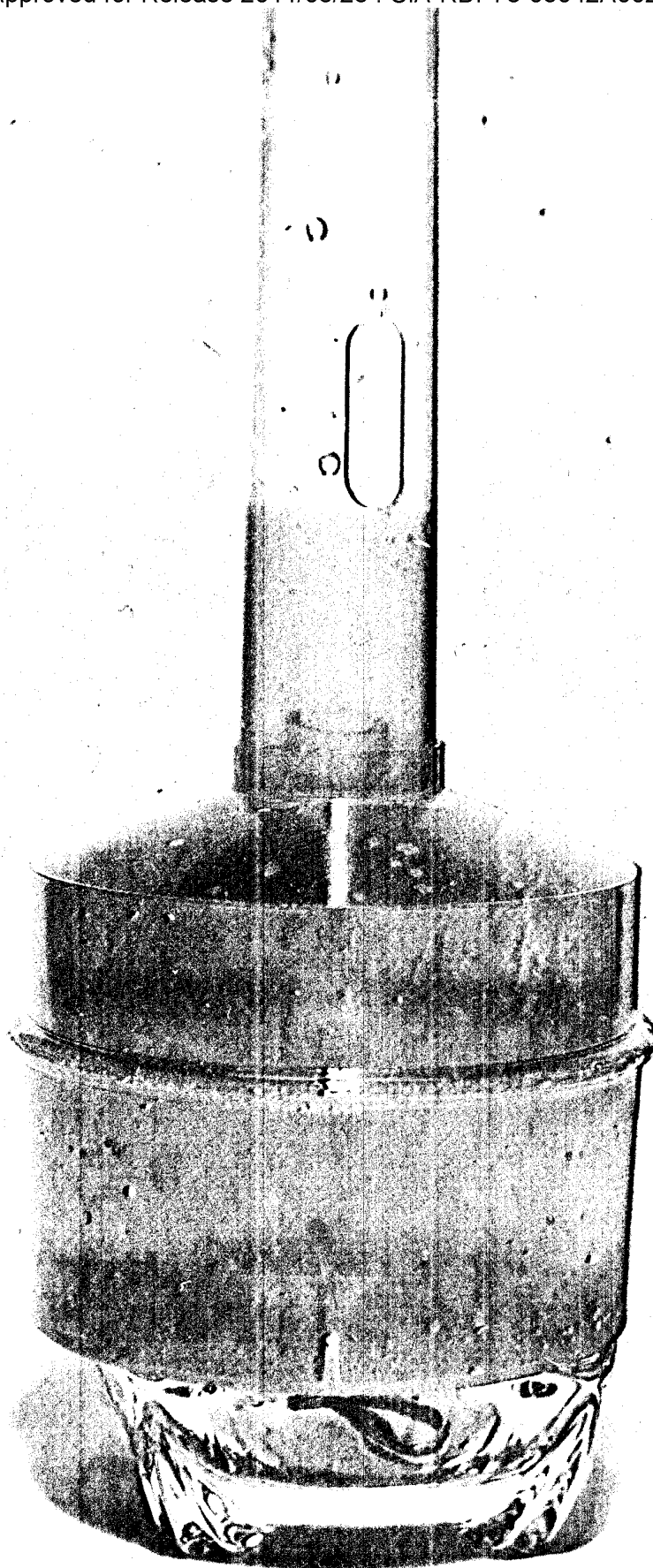
The time of flight using this ballasting unit is 8-14 hours. This time is dependent on normal atmospheric conditions, the terrain underneath, cloud formations, and the occurrence of sunset. Typical flight data is shown on numbers 730 and 731.

VI. Filling Procedure

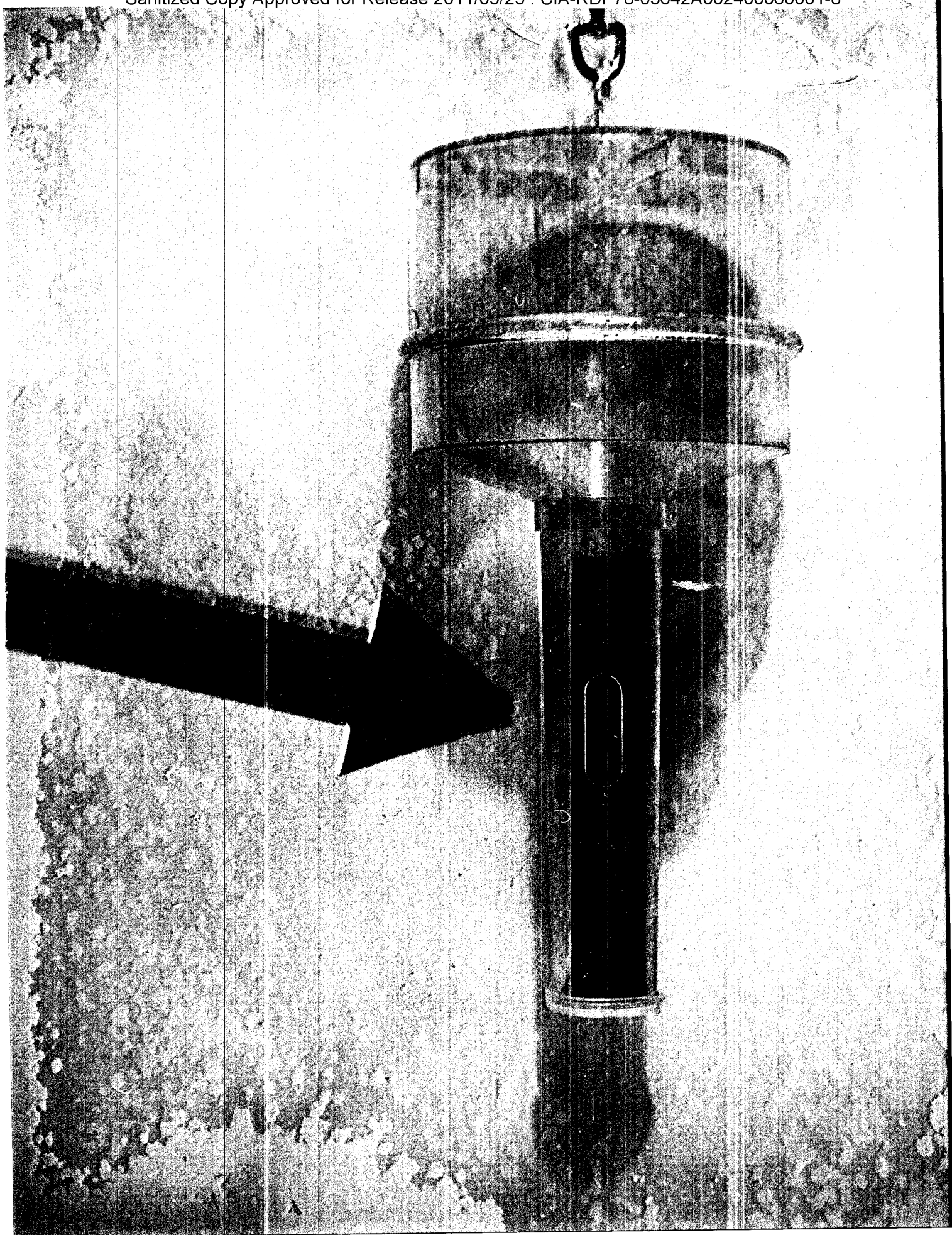
Prior to filling the ballasting unit it must be flushed with alcohol to insure that no packing material is left inside the reservoir.

To fill the ballaster reservoir invert the container (see A-1) and remove the cap and float. Slowly pour the liquid into the reservoir until it reaches the oblong slot in the neck portion of the container (see A-1). Place your thumb over the slot (see A-3) and turn the ballaster upright rapidly so that little or no air can enter the tank (see A-4). Attach to load train (see A-5) and release thumb. Excess ballast will drain out until the float valve closes. Avoid jarring or bumping since this might cause bubbles to enter tank.

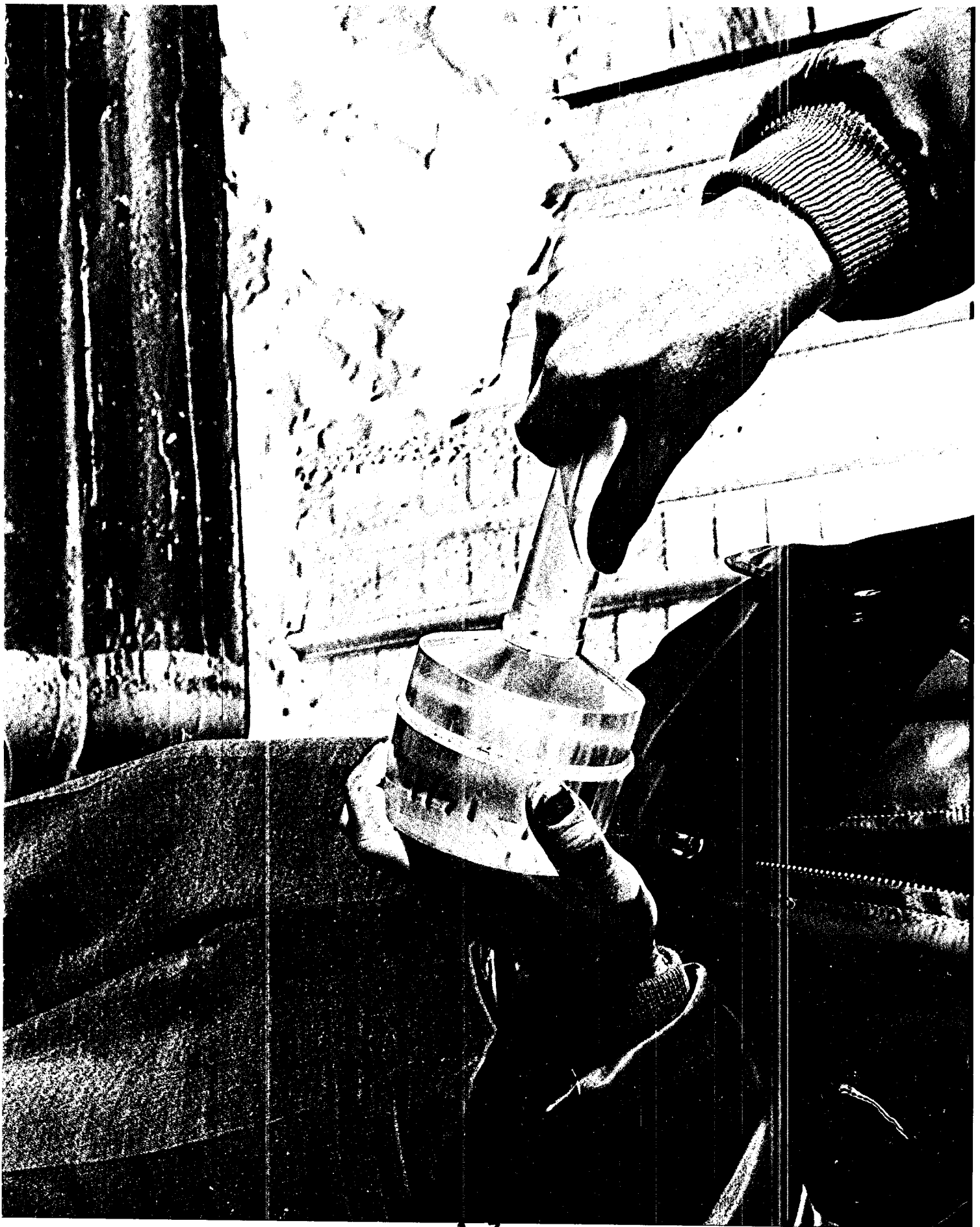
Inverting to the operating position must be done at launch area or at the same temperature. A sharp temperature decrease can cause flow.



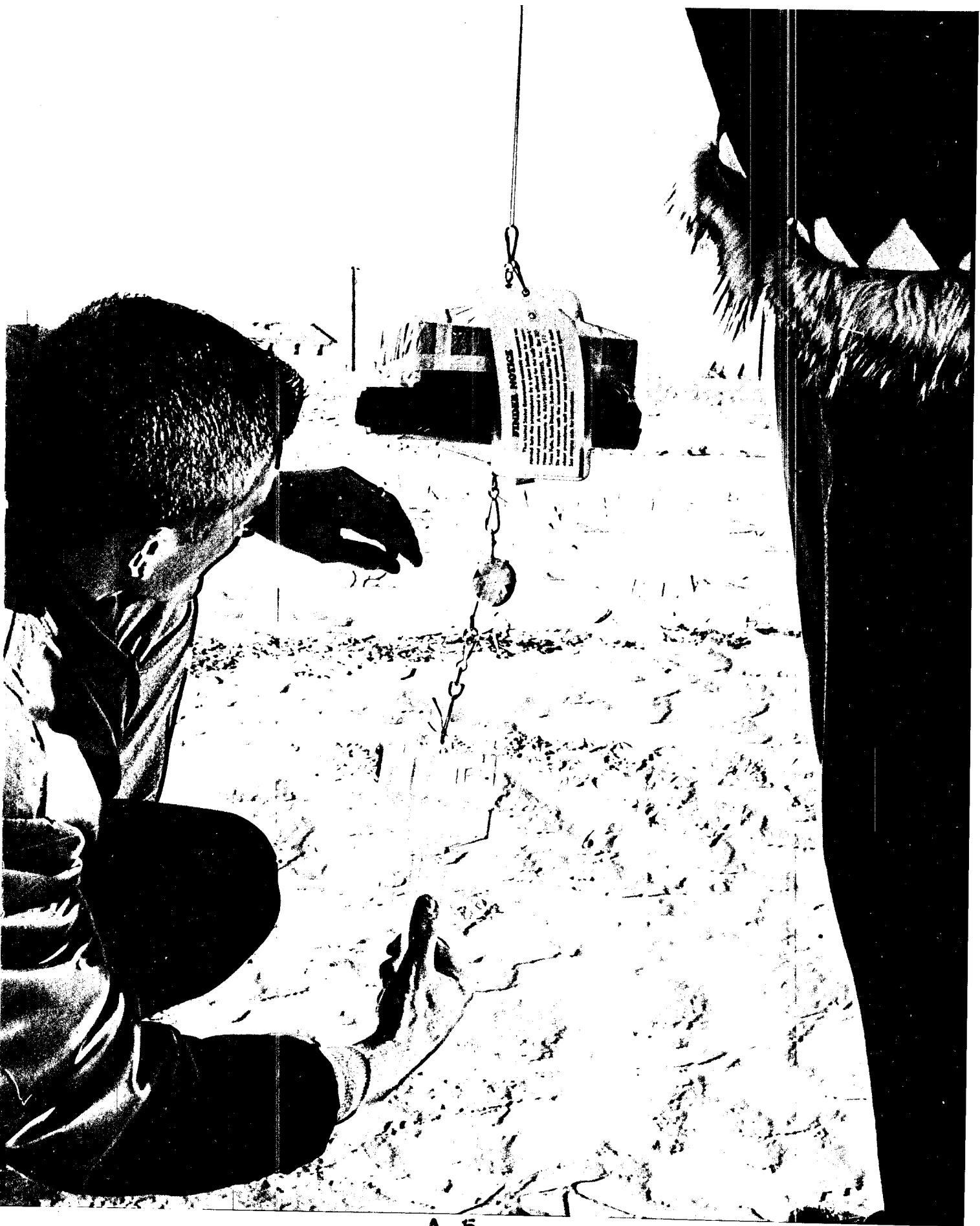
A-1



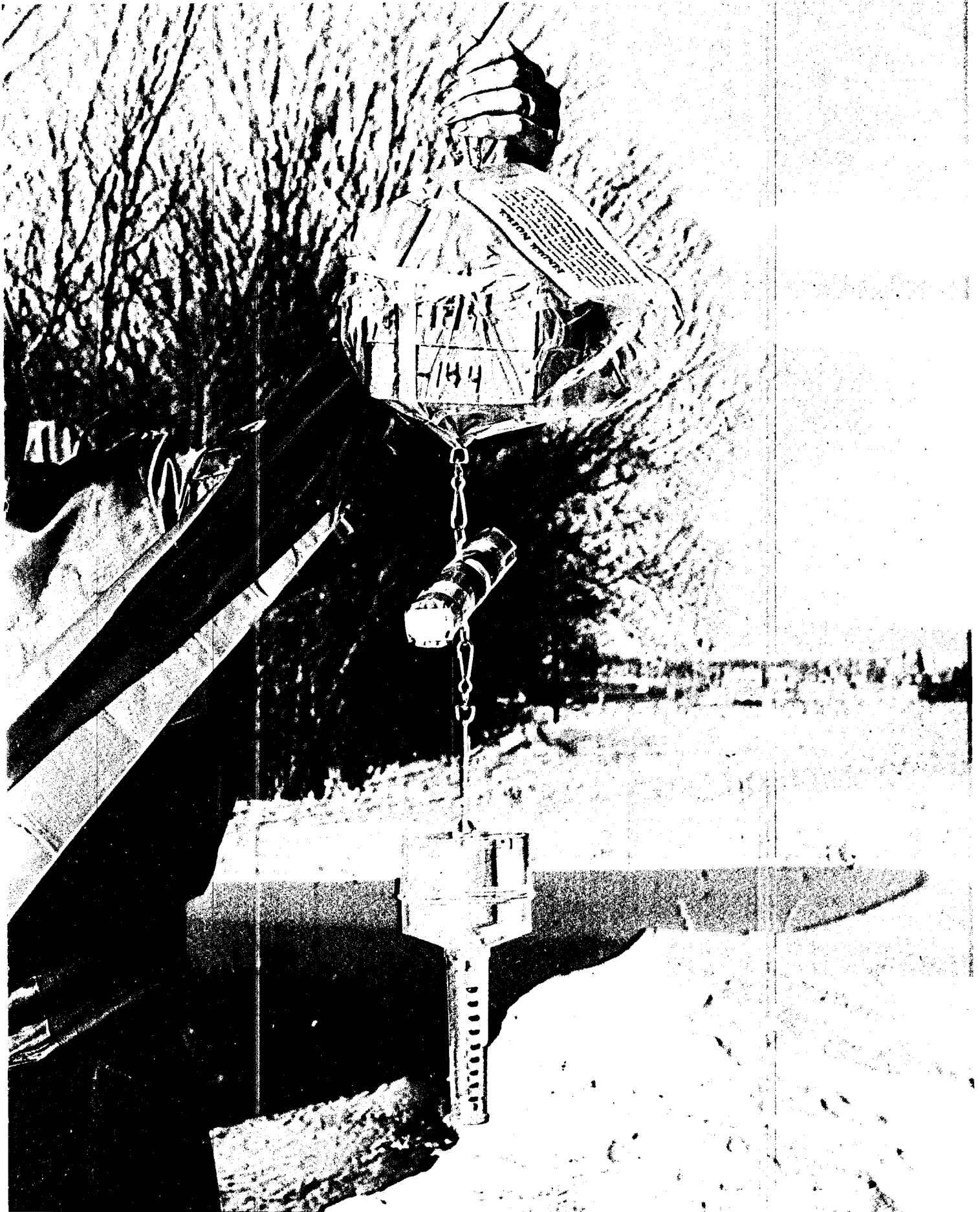
A-2



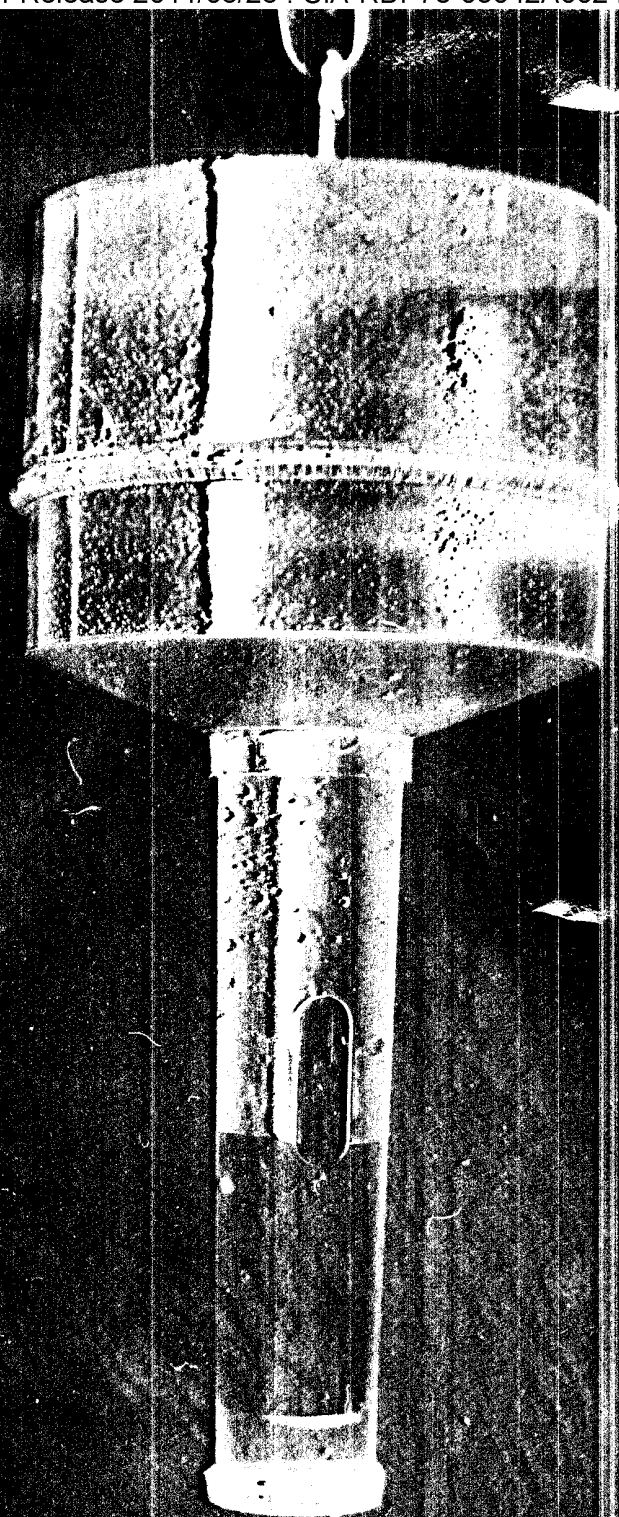


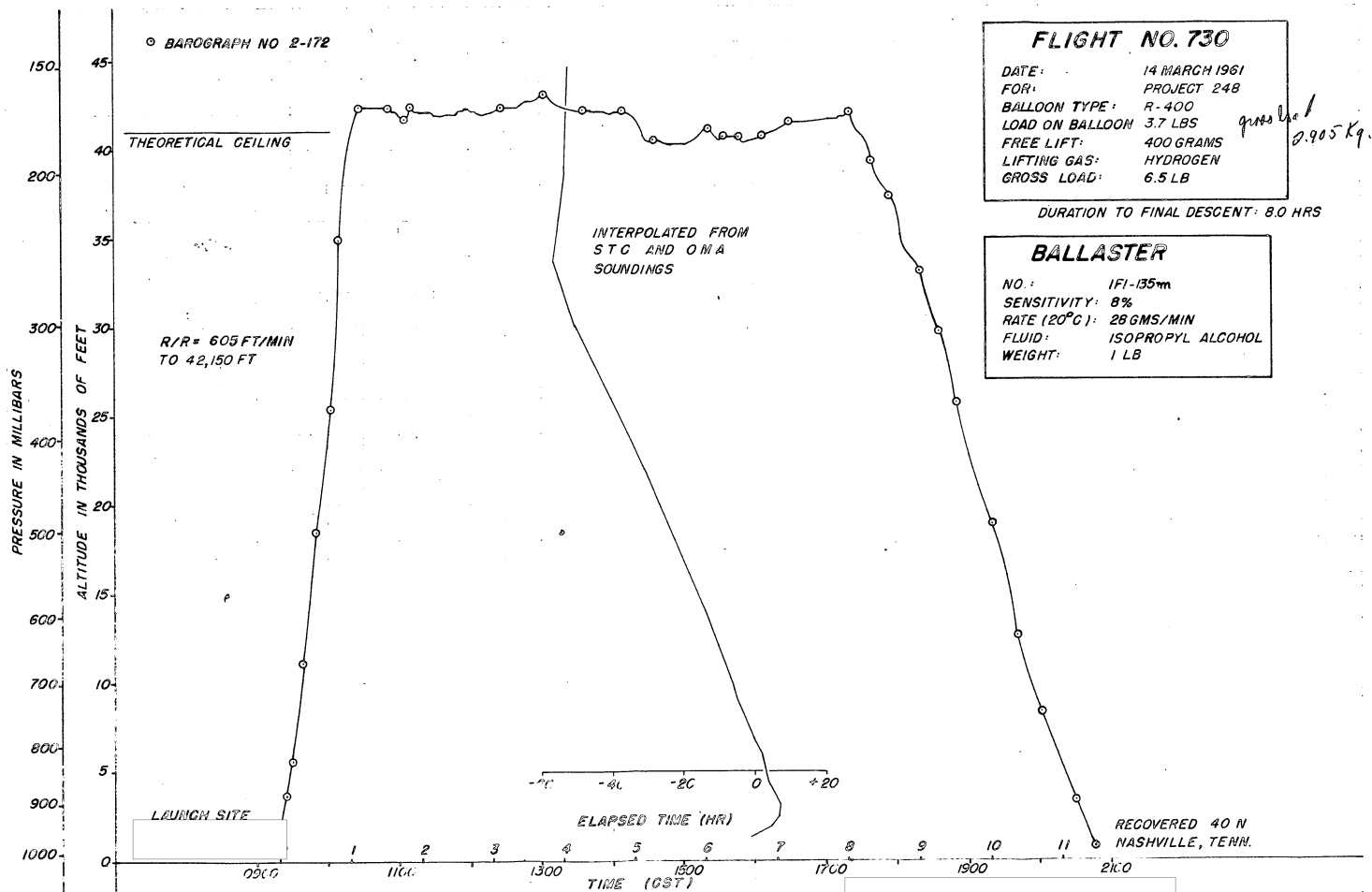


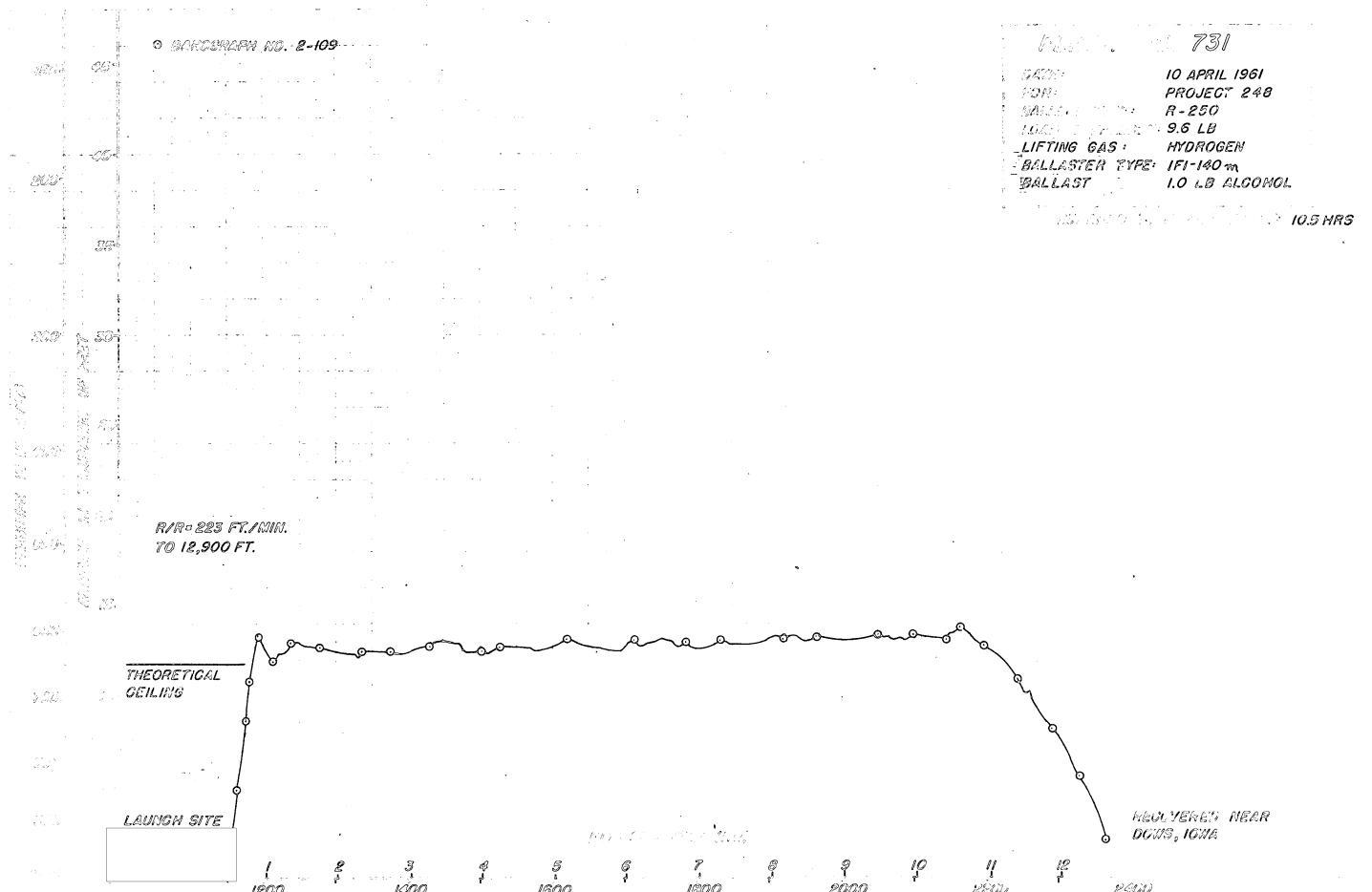
A-5



A-6







CONFIDENTIAL

CONFIDENTIAL